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Steering Controlled Adaptive Headlamps

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Abstract: ***The intention is to layout and increase a "Steering Controlled Headlight Mechanism". This is performed with the aid of using connecting headlights and steerage. Present day cars don`t have powerful lighting fixtures machine. Due to this many injuries are taking area throughout night time instances in particular in mountain sections. The injuries may be prevented with the aid of using incorporating Steering Control Headlight Mechanism. Therefore, the present invention relates to an automobile headlight, more specifically, an automobile headlight direction changing device. This allows the direction to change in synchronization with the rotation of the steering, thus improving safety at night or while driving. darkness. This project implemented the same requirements. Headlight rotation related to steering rotation with a rack and pinion mechanism.***
Keywords: Arduino, steering mechanism, headlights, servo motors, accelerometer

I. INTRODUCTION

Today, accidents no longer occur in the hills due to improper road construction. Most accidents happen at night. The cause of such an accident is that the driver cannot see the path of the road at the corner when the road equipment is not available. Present day cars don`t have powerful lighting fixtures machine. Due to this many injuries are taking area throughout night time instances in particular in mountains sections. Conventional Head lighting have a tendency to light up the aspect of the street even as cornering or shine off the street entirely, which could result in risky condition. To conquer this trouble a concept has been evolved with the aid of using introducing "Steering Controlled Head Light Mechanism". Steering Controlled Head Light Mechanism consists of Headlights, Steering System that are interconnected with the aid of using the use of linkages. The real Steering Controlled Headlight Mechanism is the headlights observe the movement of the front wheels. For this the headlights are related to the rack of the steerage machine however now no longer at once to the steerage. Generally, this can be performed with the aid of using the use of Mechanical linkages. We also can use cables to attach headlights to the steerage. Usage of cables has an extremely good gain of occupying much less area as compared to mechanical linkages.

II. STEERING MECHANISM

The main function of the steering system is to realize the angular movement of the front wheels and negotiate the turn. This is done by linkages and steering gears that convert the rotational movement of the steering wheel into the angular movement of the front wheels.

1) To ensure the directional stability of the vehicle when going straight.
2) To ensure perfect steering conditions, i.e. Always the perfect rolling movement for road wheels.
3) To make it easier to go straight after the turn is completed.
4) To minimize tire wear.

A. Requirement of Good Steering Mechanism

The steering mechanism should be very accurate and easy to use.

1) The effort required to manoeuvre is low and should not tire the driver.
2) The steering mechanism should also provide directional stability.

This means that the vehicle tends to return to its straight-ahead position after turning.

III. HEADLIGHTS

The headlights are lamps mounted on the front of the vehicle to illuminate the road ahead. The performance of headlamps has steadily improved throughout the automobile era. This is due to the large difference in deaths between day and night. The US government states that almost half of road fatalities occur in the dark, but only 25% of road accidents drive in the dark. The term headlamp is often used interchangeably in informal discussions, where headlamp is the term for the device itself, but headlamp is actually the light beam produced and distributed by the device.

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Headlights are needed for other vehicles such as trains and planes. They can be powered by a battery or a small generator on the wheel. Most adaptive headlight systems improve visibility around corners, but some can be adjusted based on weather conditions, the presence of other vehicles, and other factors. Various types of adaptive headlights have existed for much of the history of the vehicle, but in recent years there has been a renewed interest in this technology.

IV. ELECTRICAL SYSTEM

A. Automotive Battery

The battery which is used in vehicles is a type of rechargeable battery that generates electrical energy and supplies the electrical energy to the various accessories of car. This typically refers to the Starting of engine, Lighting of headlights, and Ignition. Automotive batteries are lead-acid batteries and consist of six galvanic cells connected in series to generate a 12 volt current. Each cell supplies 2.1 volts when fully charged, for a total of 12.6 volts. Large vehicles such as trucks and tractors have diesel engines which may have two batteries connected in series for a 24-volt current. Lead-acid batteries consist of a lead plate soaked in about 35% sulphuric acid and 65% water electrolyte and a separate lead dioxide plate. This causes a chemical reaction that emits electrons, which flow through the conductors and generate electricity.

V. CONSTRUCTION

Implementing the headlight mechanism requires a simple structure, which is a very simple process.
Below are four steps to follow when finding a steering control mechanism.

1) Step: 1 frame structure
2) Step: 2 Headlight installation
3) Step: 3 Rotation of headlights
4) Step: 4 Connect the headlights and steering

The above four steps include building a steering control headlight mechanism.

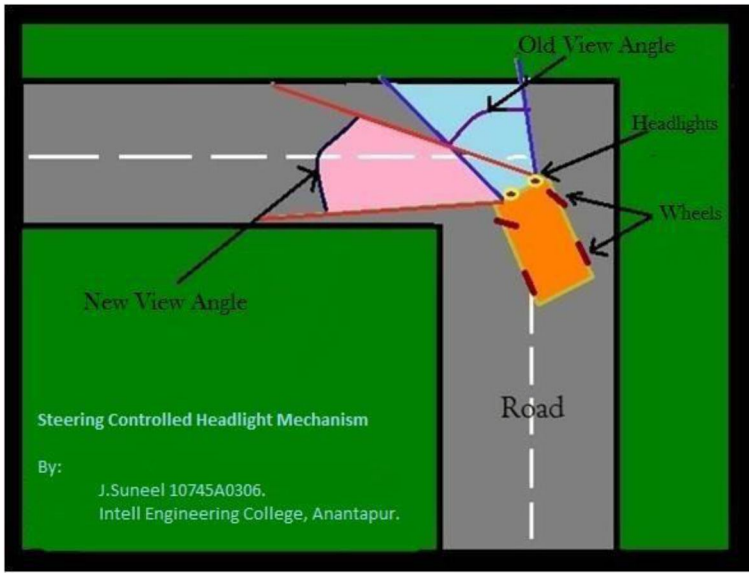


Fig – working of adaptive headlamps

The above fig shows the working of adaptive headlamps. The most important purpose of this mechanism is to improve lighting when cornering. The blue line in the image above represents the old perspective of a four-wheeled vehicle before the steering-controlled headlight mechanism was rented. The angle of the incident range of light is very small, and most of the light is useless and not within the required range. This does not improve driver visibility, especially when cornering at night. To overcome this problem, the vehicle is provided with a steering-controlled headlight mechanism. In this mechanism, the headlights and steering are linked so that the headlights follow the curve of the vehicle and improve cornering lighting.

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VI. COMPONENTS REQUIRED

1) *Arduino UNO Nano:* This Arduino-compatible Nano V3.0 microcontroller is a small, complete board based on the ATmega328 MCU. It has roughly the same functionality as the Arduino Duemilanove, but in a smaller package. It only lacks a DC power jack and employs the more compact Mini USB (Mini-B) connector rather than a standard USB connector. It is compatible with Arduino programmes and the Arduino IDE. The CH340G USB interface controller is used in this version of the Nano. It can be powered by a Mini-B USB connection, an unregulated 6-20V external power supply (pin 30), or a 5V regulated external power supply (pin 27). The highest voltage source is automatically selected as the power source.

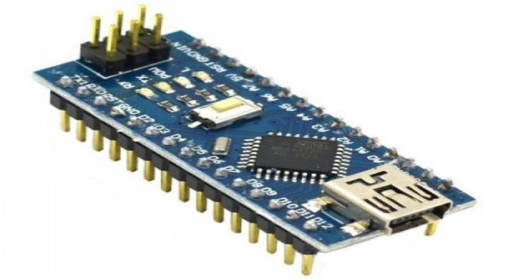


Fig- Arduino nano

2) *Servo Motors:* A servomotor is a rotary actuator or linear actuator that can control angular or linear position, velocity, and acceleration precisely. It consists of a suitable motor coupled to a sensor for position feedback. It also necessitates a fairly sophisticated controller, which is frequently a dedicated module designed specifically for use with servomotors.



Fig – servo motor

3) *Accelerometer:* A device used to measure the orientation of a vehicle as it moves up and down. Depending on the orientation, an analog value is given to the microcontroller equipped with the ADC (Analog-Digital Converter), and the microcontroller determines the movement of the headlight according to the program.



Fig- accelerometer sensor

a) Connecting Wires
b) 2 headlights
c) 9 v battery

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4) Circuit Diagram

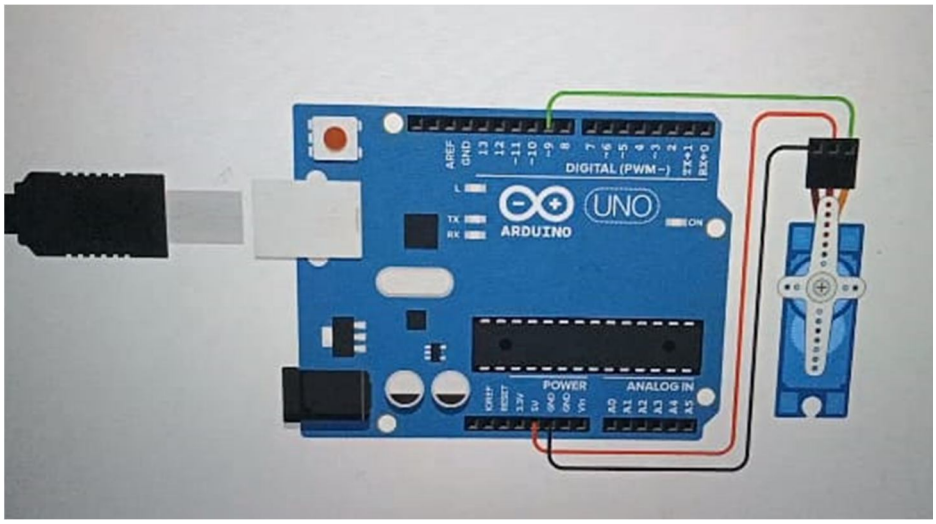


Fig- circuit diagram on Arduino software

VII. ADVANTAGE

1) Provide a smooth and safe ride on winding roads.
2) Provide the driver with an unthinkable journey.
3) Provide an accident-free road to the country.
4) Maintenance is easy.
5) This is an enhanced security measure introduced in automobiles.
6) Easy to use.

VIII. CONCLUSION

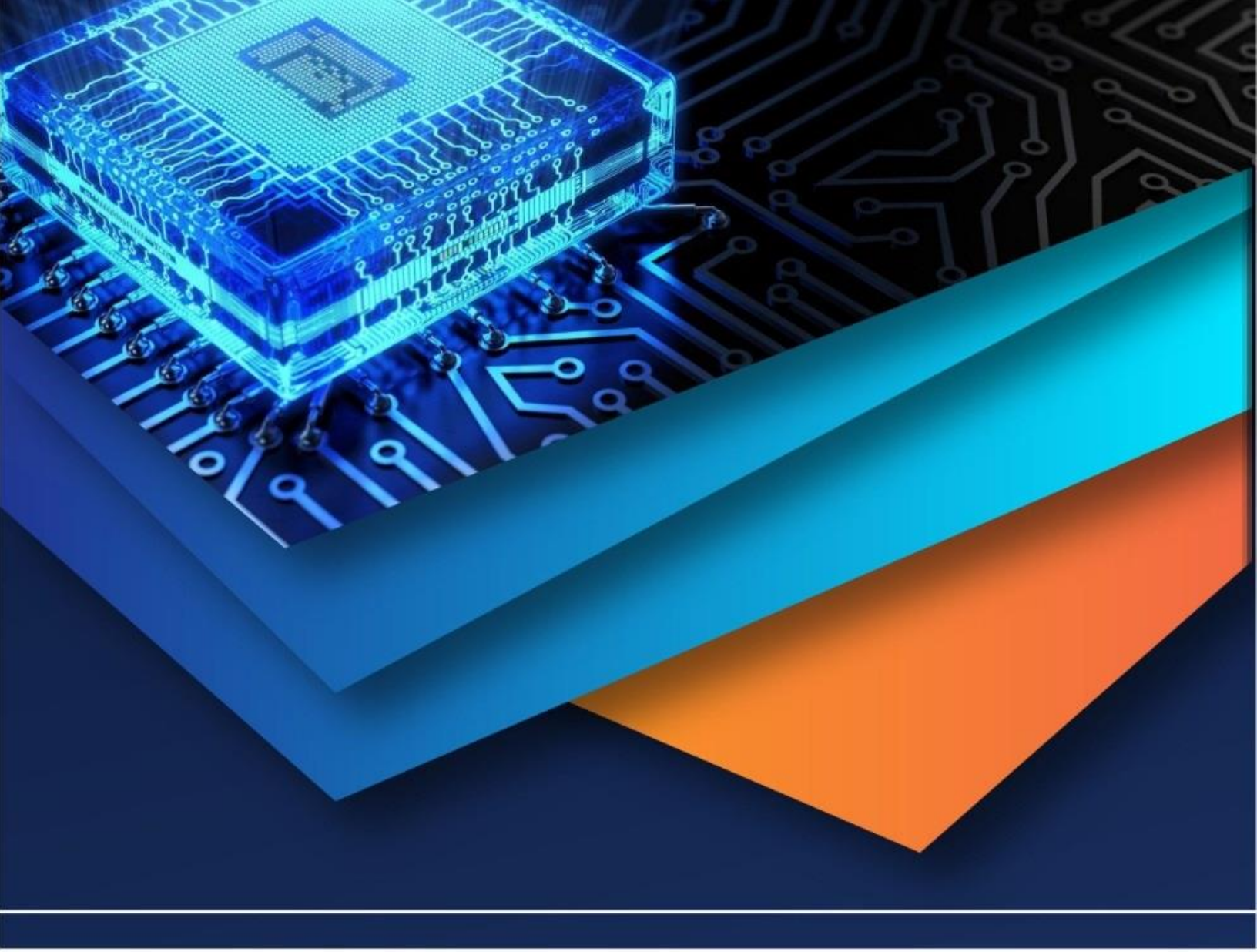
Based on the Ackermann steering mechanism, an effective steering control headlight mechanism was designed and a live model was developed. Currently we had achieved the headlight angle of approx. 90 degrees. And we are working to minimize the angle. We had used the accelerometer to detect the direction of the steering and to convert the signal and send it to the Arduino which clarifies the signal and send it to the servomotors to rotate the headlights. The servomotors helps the headlights to move with the direction of steering.

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